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# (12) United States Patent

Gregory et al.

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US 6,210,939 B1

(45) Date of Patent:

Apr. 3, 2001

## (54) RECOMBINANT ADENOVIRAL VECTOR AND METHODS OF USE

(75) Inventors: Richard J. Gregory, Carlsbad; Ken N. Wills, Encinitas; Daniel C. Maneval, San Diego, all of CA (US)

(73) Assignee: Canji, Inc., San Dicgo, CA (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35

U.S.C. 154(b) by 0 days.

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(22) Filed: Oct. 25, 1994

## Related U.S. Application Data

(63) Continuation-in-part of application No. 08/233.777, filed on May 10, 1004, now abandoned which is a continuation in part of application No. 08/142,009, filed on Oct. 25, 1093, new abandoned.

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## (57) ABSTRACT

This invention provides a recombinant adenovirus expression vector characterized by the partial or total deletion of the adenoviral protein IX DNA and having a gene encoding a foreign protein or a functional fragment or mutant thereof. Transformed host cells and a method of producing recombinant proteins and gene therapy also are included within the scope of this invention. Thus, for example, the adenoviral vector of this invention can contain a foreign gene for the expression of a protein effective in regulating the cell cycle, such as p53, Rb, or mitosin, or in inducing cell death, such as the conditional suicide gene thymidine kinase. (The latter must be used in conjunction with a thymidine kinase metabolite in order to be effective).

25 Claims, 23 Drawing Sheets-